Injury Mortality in Michigan

2002 – 2005

May 2007

Michigan Department of Community Health

Jennifer M. Granholm, Governor
Janet Olszewski, Director

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EXECUTIVE SUMMARY

This is the fourth report on deaths due to injury and poisoning among Michigan residents. The report examines demographic characteristics (age, sex, race, county of residence) of those fatally injured during 2002-2005. In addition, it provides temporal injury mortality data for Michigan and U.S. residents for the period 1990-2005. The salient findings are:

- Between 2002 and 2005, an average of 5,344 Michigan residents died each year due to injuries and poisonings. This corresponds to an average annual rate of 53.0 deaths per 100,000 Michigan residents.

- There were an average of 3,311 unintentional injury deaths per year (62% of all injuries), 1,078 suicides (20%) and 670 homicides (13%).

- The rate of injury death in Michigan decreased from 1990 to 1998. From 1999 to 2005, the rate increased slightly. For all years, Michigan's injury death rate was slightly less than the national rate.

- The leading causes of fatal injury were: motor vehicle traffic crashes (23.1% of all deaths); unintentional falls (11.1%); firearm suicides (10.2%); unintentional poisonings (9.6%); and firearm homicides (9.1%).

- Suicide rates were generally higher in less populous counties while homicide rates were higher in more populated counties. The homicide rate was highest in Wayne County. Its rate was three times the state rate and double the second highest rate (Saginaw County).

- The suicide rate for whites was double the rate for blacks. Males had four times the rate of females.

- The homicide rate among blacks was fifteen times the rate for whites. Males had about five times the rate of females.

This report currently examines the characteristics of broad subcategories of injury: unintentional, suicide, and homicide. It will subsequently be supplemented to include analyses of specific causes of injury within each category (e.g., unintentional falls, poisoning suicides, firearm homicides) to be consistent with previously published reports.

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INTRODUCTION

Injuries are one of the most under-recognized public health problems facing society. In 2005, injuries (unintentional injuries, suicides, and homicides) were the third leading cause of death among Michigan residents.[1] Although information on the overall numbers of injury deaths is reported annually by the Michigan Department of Community Health (MDCH), analyses of specific injury causes and the demographics of injury victims have been limited. Such analyses are an essential component in the process of monitoring the magnitude and characteristics of injury deaths and developing targeted injury prevention programs.

This report illustrates the average annual numbers and rates of injury deaths that occurred among Michigan residents between 2002 and 2005. Age, sex, race, and county of residence of victims are presented for injury overall and for causes of primary interest. These analyses help to identify segments of the Michigan population at high risk for injury. In addition, temporal analyses, using data for the U.S. as reference, were conducted utilizing data covering the period 1990 to 2005. These temporal analyses illustrate trends for specific causes of injury and differences in rates between Michigan and the nation.

The format of this report is consistent with the three previous reports on injury mortality in Michigan which covered the periods 1991-1995,[2] 1994-1998,[3] and 1999-2001.[4]

DATA SOURCES AND METHODS

Data Sources

Death certificates were the source of data for injury deaths. Funeral directors, attending physicians, and medical examiners document cause of death and demographics of the decedent on the death certificate. In Michigan, these data are aggregated and maintained by the MDCH Vital Records and Health Data Development Section. MDCH maintains data on all deaths occurring within Michigan and on Michigan resident deaths occurring out-of-state. Death certificate data pertaining to the United States were obtained from the Web-based Injury Statistics Query and Reporting System (WISQARS)[5] which is managed by the U.S. Centers for Disease Control and Prevention (CDC). WISQARS is an interactive website in which users can generate customized reports by selecting injury cause, region/state of residence, year of death, and decedent demographics. The source of Michigan population data – needed to calculate population-based death rates – was the Population Estimates section of the MDCH website.[6]

Methods

A Michigan injury death was defined as a death occurring to a Michigan resident for which the underlying cause was coded within the ICD-10[7] range V01 – Y36, Y85 – Y87, Y89 (for deaths occurring between 1999 and 2005) or within the ICD-9[8] range E800 – E869, E880 – E929, E950 – E999 (for 1990-1998 deaths). Excluded were deaths due to adverse effects or complications of medical care (Y40-Y84, Y88 in ICD-10; E870-E879, E930-E949 in ICD-9) and terrorism (*U01-*U03 in ICD-10).

ICD-10 codes V01-Y98 specify the external cause of injury, including the mechanism (e.g., struck by object) and the intentionality (e.g., homicide) of the incident. A framework for presenting cause of injury information has been developed by the CDC.[9] This framework defines standard mechanism/intentionality groups. Tables 17 and 18 illustrate the annual average number of deaths for each group and the corresponding annual death rates. In this initial report, analyses of decedent age/sex/race, year of death (1990-2005), and county of residence were performed for all injuries, unintentional injuries, suicides, and homicides. In the subsequent version, additional analyses will be conducted for the specific causes of injury of most significance (e.g., unintentional falls, poisoning suicides, firearm homicides).

To calculate rates for the age/sex/race and county of residence tables, the four-year annual average number of deaths was divided by the four-year annual average population for 2002-2005; the result was multiplied by 100,000. For the temporal analyses, an age-adjusted rate was calculated for each year. Age-adjusting minimizes the effect of differences in age distribution between the populations being compared – in this case, Michigan and the United States and Michigan over time (i.e., 1990-2005). To age-adjust Michigan rates, eleven age group (under 1, 1-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-75, 75-84, 85 and older) specific rates were calculated. Each of these rates were then applied to the corresponding age groups in the US 2000 Standard Population[10] and the results summed. This total was then divided by the total US 2000 Standard Population and multiplied by 100,000. The number of U.S. deaths and the corresponding crude and age-adjusted death rates were ascertained directly from WISQARS.

To be consistent with previous reports, the first year included in temporal analyses was 1990. However, including pre-1999 deaths meant utilizing data that were coded under ICD-9. Thus, some of the differences in numbers and rates of deaths between the two time periods could have been due to differences between ICD-9 and ICD-10. The CDC National Center for Health Statistics evaluated the effects of implementing ICD-10 on mortality statistics for selected causes of death.[10] The effect on injuries overall was minor: the ICD-10/ICD-9 comparability ratio (the number of deaths coded as injuries using ICD-10 divided by the number coded as injuries using ICD-9) was 1.0159.[11] (A comparability ratio of 1.00 indicates that the same number of deaths would be assigned to a certain cause under both ICD-9 and ICD-10.) However, the ratio varies by injury cause and in some cases is significant. The report notes the appropriate ratio in the temporal analysis for each injury cause.

Rates for cells having less than six deaths over the four-year period were not calculated due to the corresponding lack of statistical stability.[†] In the tables, such instances are noted with an "*." Cells in which no deaths occurred are noted by a "-."

SYMBOLS USED IN TABLES

No deaths occurred within category	-
Quantity greater than zero but less than 0.5	0
Rate is considered statistically unstable	*

[†] A rate was considered to be unstable if its relative standard error (RSE) – the rate divided by its standard error – exceeded 41%. The RSE of all rates based on less than six deaths exceeded this limit.

ALL INJURIES & POISONINGS[1]

TABLE 1
Average Annual Number of Deaths Due to Injuries and Poisonings
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	26	21	47	17	16	33	45	38	82
1-4	23	15	38	14	10	23	38	26	64
5-9	15	13	28	11	7	18	27	20	47
10-14	34	20	54	14	7	21	49	27	77
15-19	169	65	234	64	13	76	240	81	321
20-24	213	57	269	112	19	131	338	79	417
25-29	184	50	234	110	16	125	304	70	374
30-34	190	62	252	106	22	128	303	86	388
35-44	504	205	708	133	47	180	654	260	914
45-54	490	200	690	126	53	179	628	259	886
55-64	257	106	363	51	18	69	314	128	442
65-74	195	101	296	28	11	38	227	116	342
75+	445	473	918	35	31	66	483	508	991
Total	2,743	1,386	4,129	819	269	1,087	3,648	1,696	5,344

Includes ICD-10 codes: V01 – Y36, Y85 – Y87, Y89
Numbers in columns and rows may not total exactly due to rounding.
Decedents with unknown age, race, or sex not illustrated but included in totals.
Source: Division for Vital Records and Health Statistics, MDCH

TABLE 2
Average Annual Death Rates Due to Injuries and Poisonings
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	50.6	43.1	47.0	139.5	130.1	134.9	67.3	59.6	63.6
1-4	11.0	7.3	9.2	26.9	20.1	23.6	14.0	10.1	12.1
5-9	5.4	5.0	5.2	17.0	10.5	13.8	7.6	6.0	6.8
10-14	11.3	7.0	9.2	18.6	9.1	13.9	12.7	7.4	10.1
15-19	56.0	22.8	39.9	101.2	20.8	61.5	63.8	22.7	43.7
20-24	73.6	20.5	47.6	201.6	33.6	116.2	94.9	23.0	59.5
25-29	72.9	21.0	47.6	217.5	28.8	119.2	96.2	22.7	59.9
30-34	69.8	23.4	47.0	203.6	36.6	114.6	88.6	25.2	57.0
35-44	79.0	32.6	56.0	137.4	42.0	86.2	86.0	34.0	59.9
45-54	78.1	31.8	54.9	145.0	50.9	93.7	85.8	34.4	59.8
55-64	60.4	24.1	42.0	100.3	29.2	61.1	64.7	25.0	44.3
65-74	79.0	34.5	54.8	103.4	28.0	58.9	81.7	34.3	55.7
75+	208.7	134.5	162.5	160.1	84.7	112.5	203.6	129.6	157.5
Total	67.0	33.0	49.8	115.6	34.2	72.8	73.6	33.1	53.0

Rates are the number of deaths per 100,000 population.
Decedents with unknown age, race, or sex not illustrated but included in totals.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

1. Excluded from All Injuries & Poisonings are deaths due to terrorism and adverse effects of medical/surgical treatment and therapeutic use of drugs.

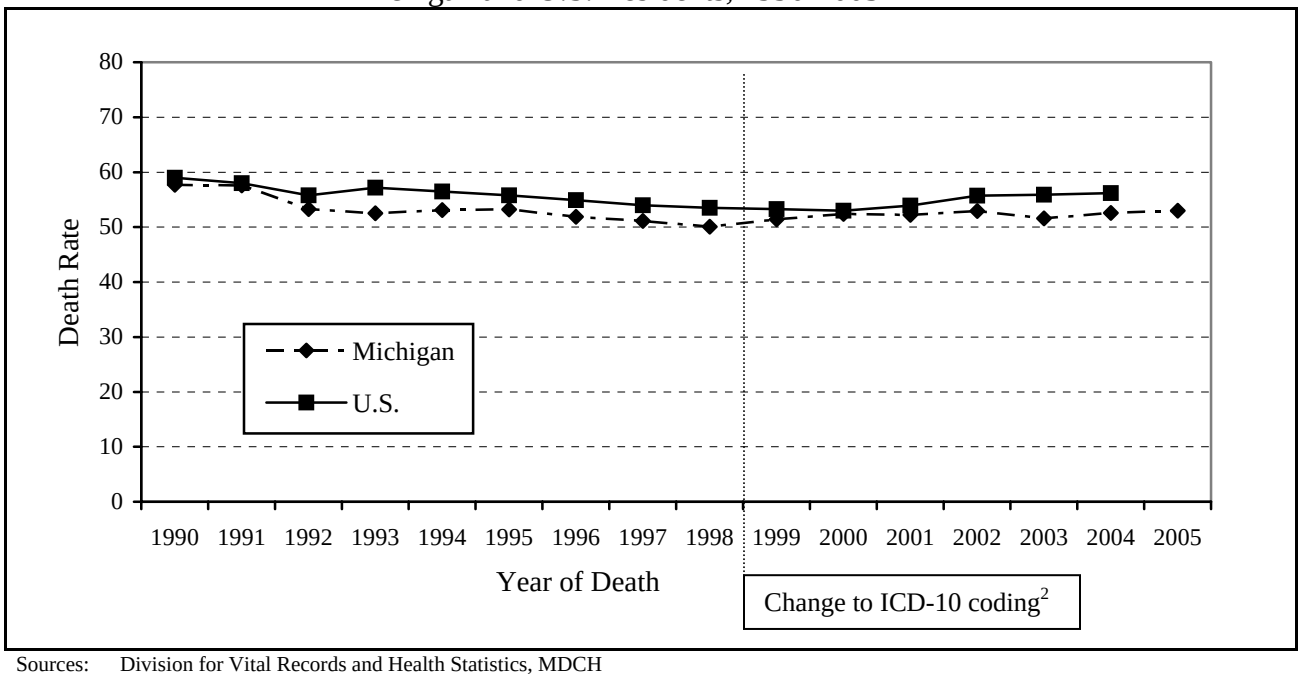
ALL INJURIES & POISONINGS

TABLE 3
Number of Deaths and Death Rates Due to Injuries and Poisonings
By Year of Death, Michigan and U.S. Residents, 1990-2005

Year	Number		Crude Rate		Age-adjusted Rate	
	MI	US	MI	US	MI	US
1990	5,294	147,376	56.9	59.1	57.7	59.0
1991	5,308	146,551	56.5	57.9	57.6	58.0
1992	4,981	142,830	52.5	55.7	53.3	55.8
1993	4,958	148,136	52.0	57.0	52.5	57.2
1994	5,027	148,152	52.4	56.3	53.1	56.5
1995	5,072	147,891	52.4	55.5	53.2	55.8
1996	5,000	147,126	51.2	54.6	51.9	54.9
1997	4,942	146,400	50.4	53.7	51.1	54.0
1998	4,880	146,941	49.6	53.3	50.1	53.5
CHANGE TO ICD-10 CODING[2]						
1999	5,034	148,286	50.9	53.1	51.4	53.3
2000	5,172	148,209	51.9	52.7	52.4	53.0
2001	5,209	154,152	52.1	54.1	52.2	53.9
2002	5,319	161,268	53.0	56.0	52.9	55.7
2003	5,244	164,002	52.0	56.4	51.6	55.9
2004	5,368	167,184	53.1	56.9	52.6	56.2
2005	5,446	not available	53.8	not available	53.0	not available

Rates are the number of deaths per 100,000 population.
1990-1998 data based on ICD-9 codes: E800 – E869, E880 – E929, E950 – E999
1999-2005 data based on ICD-10 codes: V01 – Y36, Y85 – Y87, Y89

FIGURE 1
Age-adjusted Death Rates Due to Injuries and Poisonings
Michigan and U.S. Residents, 1990-2005



Sources: Division for Vital Records and Health Statistics, MDCH
Web-based Injury Statistics Query and Reporting System, U.S. Centers for Disease Control and Prevention
Population Estimates released by the National Center for Health Statistics, CDC

2. Since 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The comparability ratio (see page 2 in Methods) for all injuries and poisonings is 1.0159.[11]

ALL INJURIES & POISONINGS

TABLE 4
Average Annual Number of Deaths and Death Rates Due to Injuries and Poisonings
By County of Residence, Michigan Residents, 2002-2005

County	Number	Crude Rate	County	Number	Crude Rate
Alcona	11	96.8	Lapeer	47	51.4
Alger	7	66.7	Leelanau	10	46.7
Allegan	63	56.1	Lenawee	38	37.0
Alpena	21	69.2	Livingston	71	40.4
Antrim	14	58.8	Luce	5	72.6
Arenac	10	55.1	Mackinac	7	59.0
Baraga	6	62.8	Macomb	358	43.7
Barry	41	69.9	Manistee	19	73.5
Bay	59	54.0	Marquette	39	59.9
Benzie	10	56.6	Mason	17	58.9
Berrien	86	52.9	Mecosta	21	49.5
Branch	25	53.2	Menominee	16	64.8
Calhoun	92	66.3	Midland	32	37.8
Cass	32	62.4	Missaukee	8	52.7
Charlevoix	16	60.1	Monroe	73	47.8
Cheboygan	19	69.5	Montcalm	40	63.3
Chippewa	17	43.2	Montmorency	6	59.6
Clare	23	71.8	Muskegon	91	52.1
Clinton	31	45.5	Newaygo	30	61.1
Crawford	13	87.6	Oakland	495	40.9
Delta	21	54.1	Oceana	21	72.8
Dickinson	16	57.1	Ogemaw	13	59.5
Eaton	51	47.6	Ontonagon	7	86.1
Emmet	21	62.8	Osceola	14	57.0
Genesee	250	56.4	Oscoda	9	95.7
Gladwin	19	68.5	Otsego	12	48.2
Gogebic	11	65.5	Ottawa	92	36.7
Grand Traverse	39	47.3	Presque Isle	9	64.6
Gratiot	22	52.5	Roscommon	18	69.1
Hillsdale	29	61.0	Saginaw	133	63.5
Houghton	21	57.5	St. Clair	84	49.2
Huron	19	54.9	St. Joseph	38	59.8
Ingham	118	42.0	Sanilac	22	49.7
Ionia	36	55.5	Schoolcraft	6	71.0
Iosco	15	55.8	Shiawassee	45	61.6
Iron	11	83.4	Tuscola	37	63.7
Isabella	32	48.5	Van Buren	58	73.5
Jackson	96	58.9	Washtenaw	119	35.3
Kalamazoo	133	55.1	Wayne	1,309	64.8
Kalkaska	9	52.5	Wexford	21	65.3
Kent	287	48.5	Unknown	1	
Keweenaw	2	101.1			
Lake	11	88.6	Michigan	5,344	53.0

Includes ICD-10 codes: V01 – Y36, Y85 – Y87, Y89
Rates are the number of deaths per 100,000 population.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

UNINTENTIONAL INJURIES

TABLE 5
Average Annual Number of Deaths Due to Unintentional Injuries
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	22	18	40	15	13	28	38	31	69
1-4	19	12	32	9	5	13	28	18	46
5-9	14	11	25	9	4	13	24	15	39
10-14	27	16	42	10	3	13	37	20	56
15-19	115	52	167	20	5	24	139	59	198
20-24	134	40	174	19	8	27	160	50	211
25-29	96	27	123	23	7	30	125	36	161
30-34	98	30	128	24	9	33	125	39	164
35-44	264	111	375	46	21	68	320	136	456
45-54	266	115	381	70	36	106	343	154	497
55-64	148	69	217	33	14	46	185	85	271
65-74	134	87	221	19	10	29	155	100	255
75+	369	455	824	30	29	59	401	488	889
Total	1,705	1,041	2,746	325	163	488	2,080	1,232	3,311

Includes ICD-10 codes: V01 – X59, Y85, Y86
Numbers in columns and rows may not total exactly due to rounding.
Decedents with unknown age, race, or sex not illustrated but included in totals.
Source: Division for Vital Records and Health Statistics, MDCH

TABLE 6
Average Annual Death Rates Due to Unintentional Injuries
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	41.9	36.9	39.5	121.3	104.9	113.3	56.7	49.3	53.1
1-4	9.2	6.2	7.8	17.0	9.8	13.4	10.5	7.1	8.8
5-9	5.1	4.3	4.8	13.6	5.8	9.8	6.7	4.6	5.6
10-14	8.8	5.5	7.2	12.7	4.4	8.6	9.5	5.3	7.4
15-19	38.1	18.2	28.4	31.5	7.4	19.6	36.9	16.4	26.9
20-24	46.3	14.4	30.7	34.8	14.0	24.2	45.0	14.6	30.0
25-29	38.2	11.1	24.9	44.7	12.8	28.1	39.6	11.7	25.8
30-34	36.0	11.2	23.8	46.0	14.7	29.3	36.6	11.6	24.1
35-44	41.5	17.6	29.6	47.9	19.0	32.4	42.1	17.8	29.9
45-54	42.4	18.3	30.3	80.4	34.8	55.5	46.9	20.5	33.5
55-64	34.9	15.6	25.1	63.9	22.0	40.8	38.1	16.6	27.1
65-74	54.5	29.6	40.9	70.5	26.1	44.3	55.9	29.7	41.5
75+	172.8	129.5	145.9	138.0	78.6	100.5	169.3	124.6	141.4
Total	41.6	24.8	33.1	45.9	20.7	32.6	42.0	24.0	32.8

Rates are the number of deaths per 100,000 population.
Decedents with unknown age, race, or sex not illustrated but included in totals.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

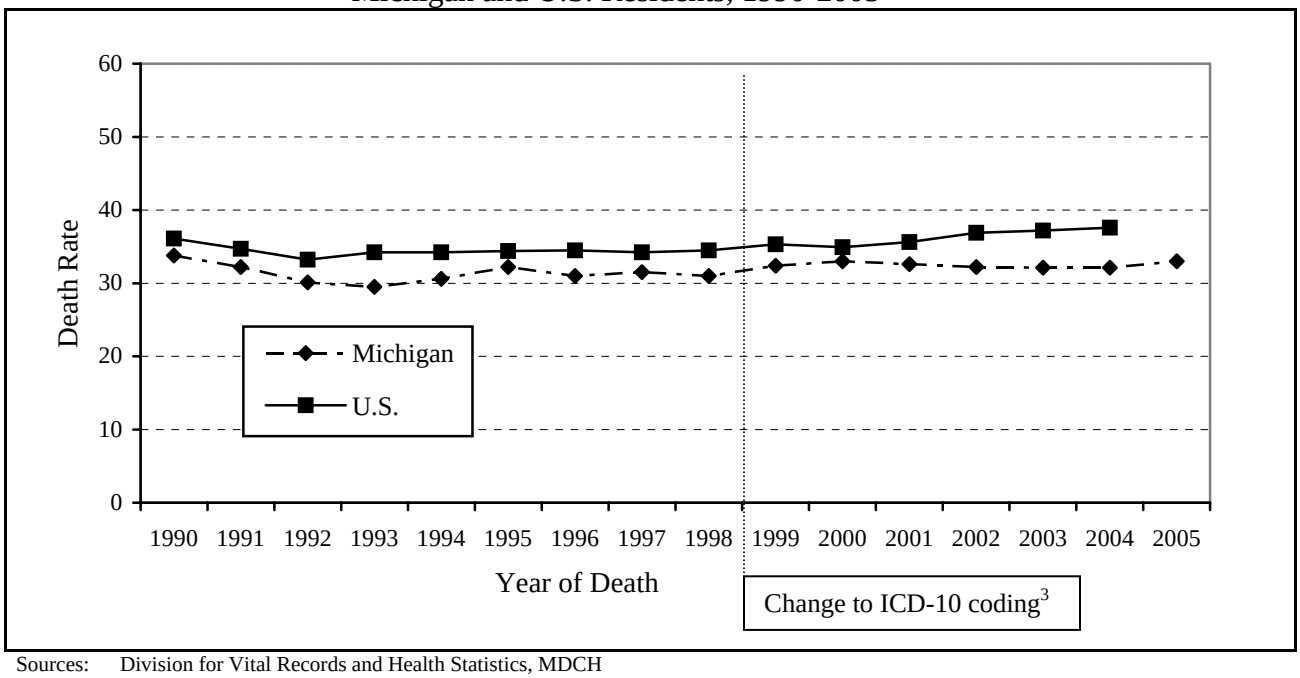
UNINTENTIONAL INJURIES

TABLE 7
Number of Deaths and Death Rates Due to Unintentional Injuries
By Year of Death, Michigan and U.S. Residents, 1990-2005

Year	Number		Crude Rate		Age-adjusted Rate	
	MI	US	MI	US	MI	US
1990	3,031	89,148	32.6	35.7	33.8	36.1
1991	2,908	86,711	30.9	34.3	32.2	34.7
1992	2,763	83,952	29.1	32.7	30.1	33.2
1993	2,742	87,598	28.7	33.7	29.5	34.2
1994	2,840	88,649	29.6	33.7	30.6	34.2
1995	3,026	90,402	31.3	34.0	32.2	34.4
1996	2,951	91,776	30.2	34.1	31.0	34.5
1997	3,017	92,353	30.8	33.9	31.5	34.2
1998	2,999	94,331	30.5	34.2	31.0	34.5
CHANGE TO ICD-10 CODING[3]						
1999	3,151	97,860	31.8	35.1	32.4	35.3
2000	3,243	97,900	32.6	34.8	33.0	34.9
2001	3,248	101,537	32.5	35.6	32.6	35.6
2002	3,242	106,742	32.3	37.1	32.2	36.9
2003	3,278	109,277	32.5	37.6	32.1	37.2
2004	3,299	112,012	32.6	38.1	32.1	37.6
2005	3,426	not available	33.9	not available	33.0	not available

Rates are the number of deaths per 100,000 population.
1990-1998 data based on ICD-9 codes: E800 – E869, E880 – E929
1999-2005 data based on ICD-10 codes: V01 – X59, Y85, Y86

FIGURE 2
Age-adjusted Death Rates Due to Unintentional Injuries
Michigan and U.S. Residents, 1990-2005



Sources: Division for Vital Records and Health Statistics, MDCH
Web-based Injury Statistics Query and Reporting System, U.S. Centers for Disease Control and Prevention
Population Estimates released by the National Center for Health Statistics, CDC

3. Since 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The comparability ratio (see page 2 in Methods) for unintentional injuries is 1.0251.[11]

UNINTENTIONAL INJURIES

TABLE 8
Average Annual Number of Deaths and Death Rates Due to Unintentional Injuries
By County of Residence, Michigan Residents, 2002-2005

County	Number	Crude Rate	County	Number	Crude Rate
Alcona	6	53.8	Lapeer	32	34.8
Alger	5	51.3	Leelanau	8	36.5
Allegan	47	42.4	Lenawee	29	28.1
Alpena	16	52.1	Livingston	43	24.4
Antrim	13	52.6	Luce	4	54.4
Arenac	7	42.0	Mackinac	5	43.7
Baraga	5	57.1	Macomb	201	24.5
Barry	30	51.2	Manistee	12	48.7
Bay	38	34.8	Marquette	28	42.5
Benzie	6	34.8	Mason	11	38.1
Berrien	60	37.0	Mecosta	16	37.0
Branch	18	38.7	Menominee	11	44.8
Calhoun	63	44.9	Midland	22	26.2
Cass	25	47.9	Missaukee	7	46.1
Charlevoix	11	41.3	Monroe	49	32.2
Cheboygan	15	54.9	Montcalm	31	48.2
Chippewa	11	29.0	Montmorency	4	40.5
Clare	15	46.5	Muskegon	68	39.1
Clinton	21	30.8	Newaygo	22	44.9
Crawford	8	53.9	Oakland	281	23.2
Delta	15	39.1	Oceana	14	48.8
Dickinson	11	40.8	Ogemaw	9	38.9
Eaton	36	33.8	Ontonagon	5	63.0
Emmet	16	48.4	Osceola	11	44.3
Genesee	131	29.6	Oscoda	5	53.2
Gladwin	15	54.6	Otsego	9	34.8
Gogebic	8	48.1	Ottawa	69	27.5
Grand Traverse	28	33.6	Presque Isle	7	45.4
Gratiot	19	43.7	Roscommon	12	46.1
Hillsdale	23	48.3	Saginaw	75	35.7
Houghton	16	44.2	St. Clair	48	28.0
Huron	16	44.9	St. Joseph	29	46.2
Ingham	80	28.5	Sanilac	16	35.8
Ionia	25	38.7	Schoolcraft	5	51.1
Iosco	11	39.0	Shiawassee	33	45.7
Iron	9	69.5	Tuscola	25	41.9
Isabella	25	37.7	Van Buren	42	53.4
Jackson	56	34.6	Washtenaw	68	20.2
Kalamazoo	95	39.3	Wayne	656	32.5
Kalkaska	6	36.4	Wexford	14	43.0
Kent	214	36.1	Unknown	1	
Keweenaw	2	89.9			
Lake	8	67.5	Michigan	3,311	32.8

Includes ICD-10 codes: V01 – X59, Y85, Y86
Rates are the number of deaths per 100,000 population.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

SUICIDE

TABLE 9
Average Annual Number of Deaths Due to Suicide
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	-	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-	-	-
5-9	-	-	-	0	-	0	0	-	0
10-14	5	3	8	1	1	2	6	4	10
15-19	42	9	51	4	1	4	47	10	57
20-24	54	9	63	9	2	11	65	11	76
25-29	57	15	72	8	1	9	67	16	83
30-34	68	19	86	10	3	12	79	22	101
35-44	170	46	215	16	5	21	191	52	244
45-54	167	53	219	8	3	11	177	58	235
55-64	91	24	114	5	1	6	97	25	122
65-74	55	10	65	3	0	3	60	10	70
75+	70	9	78	2	0	3	72	9	81
Total	777	193	970	66	16	82	862	216	1,078

Includes ICD-10 codes: X60 – X84, Y870
Numbers in columns and rows may not total exactly due to rounding.
Source: Division for Vital Records and Health Statistics, MDCH

TABLE 10
Average Annual Death Rates Due to Suicide
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	-	-	-	-	-	-	-	-	-
1-4	-	-	-	-	-	-	-	-	-
5-9	-	-	-	*	-	*	*	-	*
10-14	1.8	1.0	1.4	*	*	1.0	1.6	0.9	1.3
15-19	13.9	3.0	8.6	5.6	*	3.4	12.5	2.8	7.8
20-24	18.8	3.1	11.1	16.7	3.5	10.0	18.3	3.0	10.8
25-29	22.7	6.0	14.6	16.4	*	8.8	21.3	5.2	13.3
30-34	24.8	7.0	16.0	18.2	4.2	10.7	23.2	6.4	14.8
35-44	26.6	7.3	17.0	16.6	4.0	9.8	25.1	6.8	16.0
45-54	26.5	8.4	17.4	9.5	2.9	5.9	24.2	7.7	15.9
55-64	21.4	5.3	13.2	9.8	*	5.3	20.0	4.9	12.2
65-74	22.3	3.3	12.0	11.3	*	5.0	21.5	3.0	11.3
75+	32.6	2.5	13.9	10.4	*	4.3	30.4	2.3	12.9
Total	19.0	4.6	11.7	9.3	2.0	5.5	17.4	4.2	10.7

Rates are the number of deaths per 100,000 population.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

KEY TO SYMBOLS

No deaths occurred within category	-
Quantity greater than zero but less than 0.5	0
Rate is considered statistically unreliable	*

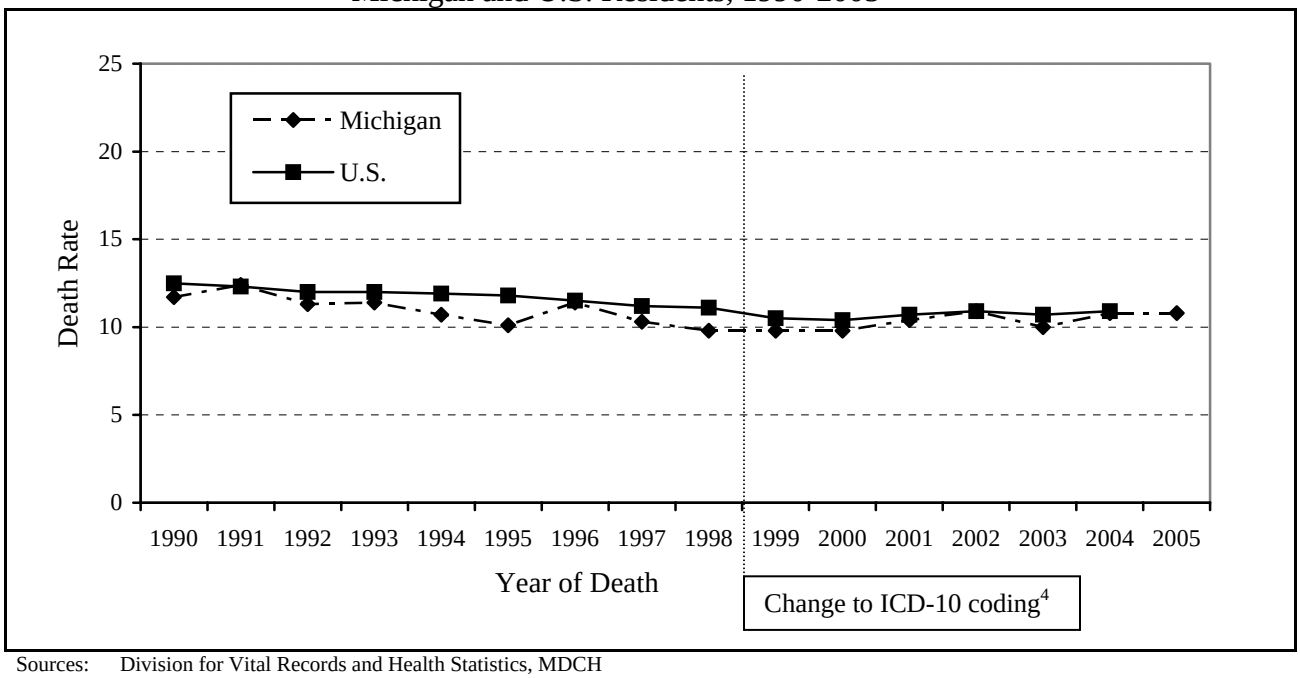
SUICIDE

TABLE 11
Number of Deaths and Death Rates Due to Suicide
By Year of Death, Michigan and U.S. Residents, 1990-2005

Year	Number		Crude Rate		Age-adjusted Rate	
	MI	US	MI	US	MI	US
1990	1,068	30,906	11.5	12.4	11.7	12.5
1991	1,139	30,810	12.1	12.2	12.4	12.3
1992	1,063	30,484	11.2	11.9	11.3	12.0
1993	1,078	31,102	11.3	12.0	11.4	12.0
1994	1,022	31,142	10.6	11.8	10.7	11.9
1995	969	31,284	10.0	11.7	10.1	11.8
1996	1,107	30,903	11.3	11.5	11.4	11.5
1997	1,003	30,535	10.2	11.2	10.3	11.2
1998	965	30,575	9.8	11.1	9.8	11.1
CHANGE TO ICD-10 CODING[4]						
1999	969	29,199	9.8	10.5	9.8	10.5
2000	975	29,350	9.8	10.4	9.8	10.4
2001	1,045	30,618	10.4	10.7	10.4	10.7
2002	1,095	31,655	10.9	11.0	10.9	10.9
2003	1,018	31,484	10.1	10.8	10.0	10.7
2004	1,096	32,439	10.8	11.0	10.8	10.9
2005	1,103	not available	10.9	not available	10.8	not available

Rates are the number of deaths per 100,000 population.
1990-1998 data based on ICD-9 codes: E950 – E959
1999-2005 data based on ICD-10 codes: X60 – X84, Y870 (excludes deaths due to terrorism)

FIGURE 3
Age-adjusted Death Rates Due to Suicide
Michigan and U.S. Residents, 1990-2005



Sources: Division for Vital Records and Health Statistics, MDCH
Web-based Injury Statistics Query and Reporting System, U.S. Centers for Disease Control and Prevention
Population Estimates released by the National Center for Health Statistics, CDC

4. Since 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The comparability ratio (see page 2 in Methods) for suicide is 1.0022.[11]

SUICIDE

TABLE 12
Average Annual Number of Deaths and Death Rates Due to Suicide
By County of Residence, Michigan Residents, 2002-2005

County	Number	Crude Rate	County	Number	Crude Rate
Alcona	4	34.4	Lapeer	10	10.9
Alger	1	*	Leelanau	2	8.0
Allegan	12	11.0	Lenawee	7	7.2
Alpena	4	13.0	Livingston	18	10.3
Antrim	2	6.2	Luce	1	*
Arenac	2	8.7	Mackinac	2	15.3
Baraga	1	*	Macomb	87	10.6
Barry	10	16.1	Manistee	5	20.9
Bay	13	11.7	Marquette	9	13.5
Benzie	4	20.3	Mason	5	17.3
Berrien	19	11.5	Mecosta	5	10.7
Branch	6	11.8	Menominee	4	16.9
Calhoun	20	14.4	Midland	8	9.8
Cass	7	13.1	Missaukee	1	*
Charlevoix	4	16.0	Monroe	19	12.2
Cheboygan	3	11.0	Montcalm	9	13.4
Chippewa	5	12.3	Montmorency	2	14.3
Clare	6	19.7	Muskegon	16	8.9
Clinton	9	13.2	Newaygo	7	13.1
Crawford	5	30.3	Oakland	117	9.7
Delta	6	14.3	Oceana	4	14.2
Dickinson	4	12.7	Ogemaw	4	18.3
Eaton	12	11.0	Ontonagon	2	19.9
Emmet	5	13.6	Osceola	3	11.6
Genesee	50	11.4	Oscoda	3	29.3
Gladwin	3	11.1	Otsego	3	11.3
Gogebic	3	14.6	Ottawa	18	7.3
Grand Traverse	11	13.0	Presque Isle	3	17.4
Gratiot	3	6.5	Roscommon	5	19.2
Hillsdale	6	11.7	Saginaw	23	10.8
Houghton	4	11.9	St. Clair	5	11.2
Huron	3	8.6	St. Joseph	2	17.0
Ingham	24	8.5	Sanilac	9	12.7
Ionia	10	15.3	Schoolcraft	20	11.9
Iosco	4	14.9	Shiawassee	7	11.6
Iron	1	*	Tuscola	10	17.1
Isabella	5	8.1	Van Buren	13	16.3
Jackson	22	13.7	Washtenaw	27	8.0
Kalamazoo	27	11.3	Wayne	195	9.6
Kalkaska	2	11.7	Wexford	6	17.5
Kent	50	8.5	Unknown	0	
Keweenaw	-	-			
Lake	2	16.9	Michigan	1,078	10.7

Includes ICD-10 codes: X60 – X84, Y870
Rates are the number of deaths per 100,000 population.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

KEY TO SYMBOLS

No deaths occurred within category	-
Quantity greater than zero but less than 0.5	0
Rate is considered statistically unreliable	*

HOMICIDE

TABLE 13
Average Annual Number of Deaths Due to Homicide
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	3	2	5	2	3	4	5	5	10
1-4	3	2	4	5	5	9	8	7	15
5-9	0	1	2	2	2	4	2	3	5
10-14	1	2	3	3	3	6	5	4	9
15-19	7	3	10	39	7	46	48	10	58
20-24	16	5	20	82	9	90	101	14	115
25-29	15	6	21	76	8	83	93	14	107
30-34	11	6	17	70	9	79	82	15	97
35-44	25	16	41	66	16	82	93	33	125
45-54	17	10	27	41	8	48	59	18	77
55-64	8	5	12	11	3	14	19	7	26
65-74	5	2	8	5	1	6	11	3	14
75+	4	6	10	2	1	4	6	7	13
Total	114	64	178	401	72	473	530	140	670

Includes ICD-10 codes: X85 – Y09, Y871
Numbers in columns and rows may not total exactly due to rounding.
Source: Division for Vital Records and Health Statistics, MDCH

TABLE 14
Average Annual Death Rates Due to Homicide
By Age, Race, and Sex
Michigan Residents, 2002-2005

Age	White			Black			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	5.8	4.6	5.2	12.1	21.0	16.5	7.2	8.3	7.8
1-4	1.3	0.8	1.0	9.0	9.8	9.4	3.0	2.6	2.8
5-9	*	*	0.3	2.3	3.1	2.7	0.6	1.0	0.8
10-14	*	0.5	0.5	3.9	3.4	3.6	1.2	1.1	1.2
15-19	2.2	1.1	1.6	62.6	11.0	37.1	12.7	2.7	7.8
20-24	5.4	1.6	3.5	147.8	14.9	80.2	28.4	4.0	16.4
25-29	6.0	2.3	4.2	150.0	14.2	79.3	29.4	4.5	17.1
30-34	4.0	2.4	3.2	133.2	15.1	70.3	23.8	4.5	14.2
35-44	3.9	2.5	3.2	68.1	14.1	39.1	12.2	4.2	8.2
45-54	2.7	1.5	2.1	46.7	7.4	25.3	8.0	2.4	5.2
55-64	1.8	1.0	1.4	21.6	4.0	11.9	3.9	1.4	2.6
65-74	2.1	0.8	1.4	19.7	*	8.9	4.0	0.9	2.3
75+	1.8	1.6	1.7	10.4	*	6.0	2.5	1.8	2.1
Total	2.8	1.5	2.1	56.7	9.1	31.7	10.7	2.7	6.6

Rates are the number of deaths per 100,000 population.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

KEY TO SYMBOLS

No deaths occurred within category	-
Quantity greater than zero but less than 0.5	0
Rate is considered statistically unreliable	*

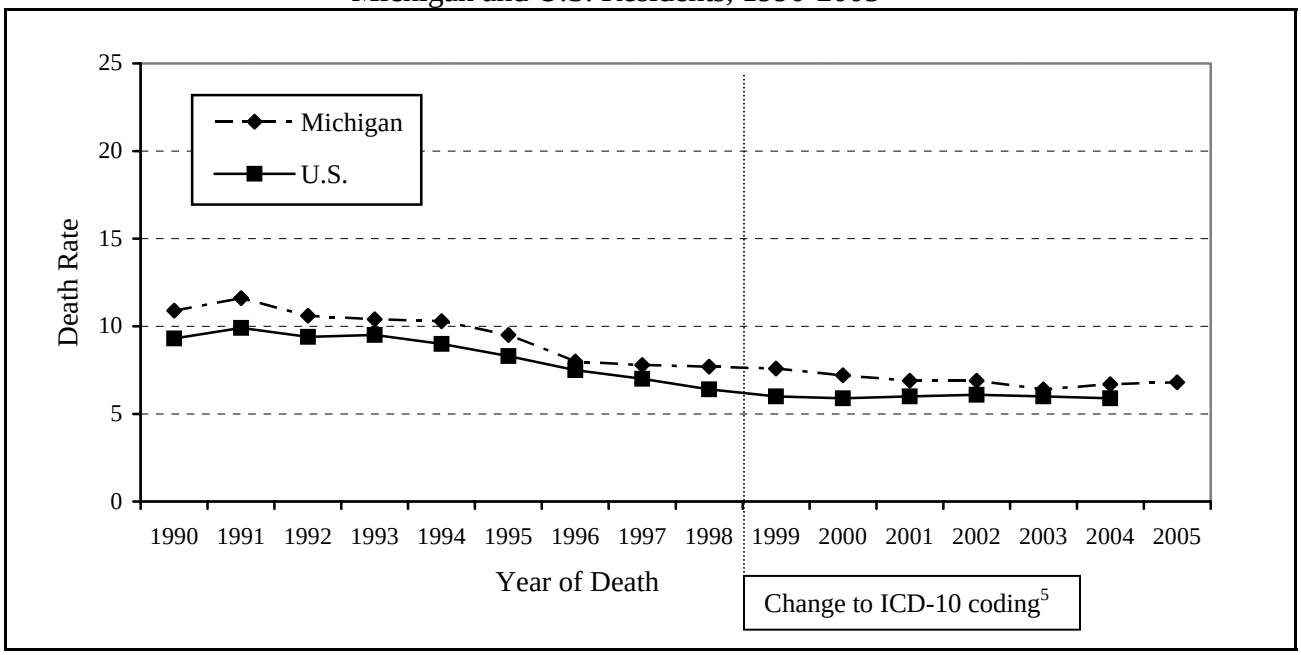
HOMICIDE

TABLE 15
Number of Deaths and Death Rates Due to Homicide
By Year of Death, Michigan and U.S. Residents, 1990-2005

Year	Number		Crude Rate		Age-adjusted Rate	
	MI	US	MI	US	MI	US
1990	1,068	24,614	11.5	9.9	10.9	9.3
1991	1,129	26,254	12.0	10.4	11.6	9.9
1992	1,042	25,144	11.0	9.8	10.6	9.4
1993	1,024	25,653	10.7	9.9	10.4	9.5
1994	1,015	24,547	10.6	9.3	10.3	9.0
1995	938	22,552	9.7	8.5	9.5	8.3
1996	795	20,634	8.1	7.7	8.0	7.5
1997	772	19,491	7.9	7.1	7.8	7.0
1998	763	17,893	7.7	6.5	7.7	6.4
CHANGE TO ICD-10 CODING[5]						
1999	749	16,889	7.6	6.1	7.6	6.0
2000	719	16,765	7.2	6.0	7.2	5.9
2001	684	17,386	6.8	6.1	6.9	6.0
2002	689	17,637	6.9	6.1	6.9	6.1
2003	644	17,732	6.4	6.1	6.4	6.0
2004	672	17,357	6.7	5.9	6.7	5.9
2005	673	not available	6.6	not available	6.8	not available

Rates are the number of deaths per 100,000 population.
1990-1998 data based on ICD-9 codes: E960 – E969
1999-2005 data based on ICD-10 codes: X85 – Y09, Y871 (excludes deaths due to terrorism)

FIGURE 4
Age-adjusted Death Rates Due to Homicide
Michigan and U.S. Residents, 1990-2005



Sources: Division for Vital Records and Health Statistics, MDCH
Web-based Injury Statistics Query and Reporting System, U.S. Centers for Disease Control and Prevention
Population Estimates released by the National Center for Health Statistics, CDC

5. Since 1999, cause of death has been coded using ICD-10, a completely different coding system than ICD-9. The comparability ratio (see page 2 in Methods) for homicide is 1.0020.[11]

HOMICIDE

TABLE 16
Average Annual Number of Deaths and Death Rates Due to Homicide
By County of Residence, Michigan Residents, 2002-2005

County	Number	Crude Rate	County	Number	Crude Rate
Alcona	0	*	Lapeer	3	3.0
Alger	0	*	Leelanau	1	*
Allegan	1	*	Lenawee	0	*
Alpena	1	*	Livingston	3	1.4
Antrim	-	-	Luce	0	*
Arenac	1	*	Mackinac	-	-
Baraga	-	-	Macomb	24	2.9
Barry	1	*	Manistee	1	*
Bay	3	2.3	Marquette	1	*
Benzie	0	*	Mason	1	*
Berrien	6	3.7	Mecosta	1	*
Branch	1	*	Menominee	1	*
Calhoun	7	4.9	Midland	1	*
Cass	1	*	Missaukee	-	-
Charlevoix	1	*	Monroe	3	1.8
Cheboygan	0	*	Montcalm	1	*
Chippewa	1	*	Montmorency	0	*
Clare	1	*	Muskegon	6	3.2
Clinton	1	*	Newaygo	1	*
Crawford	0	*	Oakland	40	3.3
Delta	0	*	Oceana	2	8.0
Dickinson	1	*	Ogemaw	0	*
Eaton	3	2.3	Ontonagon	-	-
Emmet	0	*	Osceola	-	-
Genesee	44	9.8	Oscoda	1	*
Gladwin	0	*	Otsego	1	*
Gogebic	0	*	Ottawa	3	1.0
Grand Traverse	1	*	Presque Isle	0	*
Gratiot	1	*	Roscommon	0	*
Hillsdale	0	*	Saginaw	21	10.0
Houghton	-	-	St. Clair	1	*
Huron	0	*	St. Joseph	-	-
Ingham	11	4.0	Sanilac	1	*
Ionia	1	*	Schoolcraft	3	1.9
Iosco	-	-	Shiawassee	1	*
Iron	0	*	Tuscola	1	*
Isabella	1	*	Van Buren	2	2.9
Jackson	7	4.0	Washtenaw	11	3.2
Kalamazoo	7	2.9	Wayne	417	20.6
Kalkaska	0	*	Wexford	1	*
Kent	20	3.3			
Keweenaw	-	-			
Lake	0	*	Michigan	670	6.6

Includes ICD-10 codes: X85 – Y09, Y871
Rates are the number of deaths per 100,000 population.
Sources: Division for Vital Records and Health Statistics, MDCH
Population Estimates released by the National Center for Health Statistics, CDC

KEY TO SYMBOLS

No deaths occurred within category	-
Quantity greater than zero but less than 0.5	0
Rate is considered statistically unreliable	*

TABLE 17
Average Annual Number of Deaths Due to Injury and Poisoning
By Mechanism & Manner/Intent
Michigan Residents, 2002-2005

Mechanism	Manner/Intent					Total
	Unintentional	Suicide	Homicide	Undetermined	Other	
Cut/pierce	2	21	68	0	-	91
Drowning[6]	111	10	3	8		132
Non-boat-related	*96*					*96*
Boat-related	*15*					*15*
Fall	592	11	1	3		606
Fire/hot object or substance	127	6	9	7		148
Fire/flame/smoke	*125*	*6*	*9*	*7*		*146*
Hot object/substance	*3*	-	-	-		*3*
Firearm	13	545	484	7	8	1,056
Machinery	20					20
All Transport	1,345	5	2	2	-	1,353
Motor vehicle traffic	*1,237*					*1,237*
Occupant	*468*					*468*
Motorcyclist	*92*					*92*
Pedal Cyclist	*24*					*24*
Pedestrian	*154*					*154*
Other specified	*1*					*1*
Unspecified	*499*					*499*
Pedal Cyclist,non-traffic	*5*					*5*
Pedestrian, non-traffic	*27*					*27*
Other land transport	*57*					*57*
Other transport	*20*					*20*
Natural/environmental	58					58
Overexertion	-					-
Poisoning	513	213	2	221	-	949
Struck by, against	21	-	4	-	-	25
Suffocation, hanging, strangulation	206	253	20	7		485
Other specified & classifiable	43	8	15	1	0	67
Other specified, not elsewhere classifiable	40	6	39	8	1	94
Unspecified	223	2	25	13	-	262
Total	3,311	1,078	670	277	9	5,344

6. National recommendations list boat-related drownings in "Other Transport." These have been separated out here due to local interest in this cause of death.
Cells may not sum exactly to row and column totals due to rounding.
See Appendix A Table A-1 for ICD-10 codes that comprise each cell.
Includes ICD-10 codes: V01 – Y36, Y85 – Y87, Y89
Source: Division for Vital Records and Health Statistics, MDCH

KEY TO SYMBOLS

No deaths occurred within category	-
Quantity greater than zero but less than 0.5	0

TABLE 18
Average Annual Death Rates Due to Injury and Poisoning
By Mechanism & Manner/Intent
Michigan Residents, 2002-2005

Mechanism	Manner/Intent					Total
	Unintentional	Suicide	Homicide	Undetermined	Other	
Cut/pierce	0.0	0.2	0.7	*	-	0.9
Drowning[6]	1.1	0.1	0.0	0.1		1.3
Non-boat-related	*1.0*					*1.0*
Boat-related	*0.1*					*0.1*
Fall	5.9	0.1	*	0.0		6.0
Fire/hot object or substance	1.3	0.1	0.1	0.1		1.5
Fire/flame/smoke	*1.2*	*0.1*	*0.1*	*0.1*		*1.4*
Hot object/substance	*0.0*	-	-	-		*0.0*
Firearm	0.1	5.4	4.8	0.1	0.1	10.5
Machinery	0.2					0.2
All Transport	13.3	0.0	0.0	0.0	-	13.4
Motor vehicle traffic	*12.3*					*12.3*
Occupant	*4.6*					*4.6*
Motorcyclist	*0.9*					*0.9*
Pedal Cyclist	*0.2*					*0.2*
Pedestrian	*1.5*					*1.5*
Other specified	*					*
Unspecified	*5.0*					*5.0*
Pedal Cyclist,non-traffic	*0.0*					*0.0*
Pedestrian, non-traffic	*0.3*					*0.3*
Other land transport	*0.6*					*0.6*
Other transport	*0.2*					*0.2*
Natural/environmental	0.6					0.6
Overexertion	-					-
Poisoning	5.1	2.1	0.0	2.2	-	9.4
Struck by, against	0.2	-	0.0	-	-	0.3
Suffocation, hanging, strangulation	2.0	2.5	0.2	0.1		4.8
Other specified & classifiable	0.4	0.1	0.1	*	*	0.7
Other specified, not elsewhere classifiable	0.4	0.1	0.4	0.1	*	0.9
Unspecified	2.2	0.0	0.2	0.1	-	2.6
Total	32.8	10.7	6.6	2.7	0.1	53.0

6. National recommendations list boat-related drownings in "Other Transport." These have been separated out here due to local interest in this cause of death.
Cells may not sum exactly to row and column totals due to rounding.
See Appendix A Table A-1 for ICD-10 codes that comprise each cell.
Includes ICD-10 codes: V01 – Y36, Y85 – Y87, Y89
Source: Division for Vital Records and Health Statistics, MDCH

KEY TO SYMBOLS

No deaths occurred within category	-
Rate less than 0.05	0.0
Rate is considered statistically unreliable	*

APPENDIX A

Index of ICD-10 Codes for Tables 17 and 18

Table A-1 (Page 1 of 2)
Index of ICD-10 Codes for Tables 17 & 18

Mechanism	Manner/Intent				
	Unintentional	Suicide	Homicide	Undetermined	Other
Cut/pierce	W25-W29, W45	X78	X99	Y28	Y35.4
Drowning*	W65-W74, V90, V92	X71	X92	Y21	
Non-boat-related	W65-W74				
Boat-related	V90, V92				
Fall	W00-W19	X80	Y01	Y30	
Fire/hot object or substance	X00-X19	X76, X77	X97, X98	Y26, Y27	Y36.3
Fire/flame/smoke	X00-X09	X76	X97	Y26	
Hot object/substance	X10-X19	X77	X98	Y27	
Firearm	W32-W34	X72-X74	X93-X95	Y22-Y24	Y35.0
Machinery	W24, W30, W31				
All Transport	V01-V89, V91, V93-V99	X82	Y03	Y32	Y36.1
Motor vehicle traffic					
Occupant	V30-V79 (.4-.9), V83-V86 (.0-.3)				
Motorcyclist	V20-V28 (.3-.9), V29.4-V29.9				
Pedal Cyclist	V12-V14 (.3-.9), V19 (.4-.6)				
Pedestrian	V02-V04 (.1, .9), V09.2				
Other specified	V80 (.3-.5), V81.1, V82.1				
Unspecified	V87 (.0-.8), V89.2				

* The ICD-10 injury mortality matrix[9] developed by the International Collaborative Effort (ICE) on Injury Statistics and the Injury Control and Emergency Health Services (ICEHS) section of APHA does not include boat-related drownings among the Drowning category (it is grouped in Other Transport). It is separated out here due to local interest in this cause of death.

Table A-1 (Page 2 of 2)
Index of ICD-10 Codes for Tables 17 & 18

Mechanism	Manner/Intent				
	Unintentional	Suicide	Homicide	Undetermined	Other
Pedal Cyclist, non-traffic	V10, V11, V12-V14 (.0-.2), V15-V18, V19 (.0-.3, .8, .9)				
Pedestrian, non-traffic	V01, V02-V04 (.0), V05, V06, V09 (.0, .1, .3, .9)				
Other land transport	V20-V28 (.0-.2), V29 (.0-.3), V30-V79 (.0-.3), V80 (.0-.2, .6-.9), V81-V82 (.0, .2-.9), V83-V86 (.4-.9), V87.9, V88, V89 (.0, .1, .3, .9)	X82	Y03	Y32	
Transport, other	V91, V93-V99				Y36.1
Natural/environmental	W42, W43, W53-W64, W92-W99, X20-X39, X51-X57				
Overexertion	X50				
Poisoning	X40-X49	X60-X69	X85-X90	Y10-Y19	Y35.2
Struck by, against	W20-W22, W50-W52	X79	Y00, Y04	Y29	Y35.3
Suffocation, strangulation, hanging	W75-W84	X70	X91	Y20	
Other specified & classifiable	W23, W35-W41, W44, W49, W85-W91,Y85	X75, X81	X96, Y02, Y05-Y07	Y25, Y31	Y35 (.1, .5), Y36 (.0, .2, .4-.8)
Other specified, not elsewhere classifiable	X58, Y86	X83, Y87.0	Y08, Y87.1	Y33, Y87.2	Y35.6, Y89 (.0, .1)
Unspecified	X59	X84	Y09	Y34, Y89.9	Y35.7, Y36.9
Total	V01 – X59, Y85, Y86	X60 – X84, Y87.0	X85 – Y09, Y87.1	Y10-Y34, Y87.2, Y89.9	Y35 (.0-.7), Y36, Y89 (.0, .1)

Table does not include ICD-10 codes for deaths pertaining to terrorism. It also excludes deaths due to adverse effects of drugs and medical care.
Source: U.S. Centers for Disease Control and Prevention, National Center for Health Statistics[9]

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